



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,051	01/16/2004	Mark Arsenaull	1414-013	8488

7590 02/27/2007
Lawson & Persson, P.C.
Suite 103
67 Water Street
Laconia, NH 03246

EXAMINER

SHIKHMAN, MAX

ART UNIT	PAPER NUMBER
----------	--------------

2609

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/760,051	Applicant(s) ARSENAULT ET AL.	
	Examiner Max Shikhman	Art Unit 2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46, 49, 51 and 52 is/are rejected.
- 7) ☒ Claim(s) 47, 48 and 50 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. **Claim 44** is objected to because of the following informalities: Claim 44 should be dependent on claim 36. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-44 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for inverting an image, does not reasonably provide enablement for enhancing the original image using this inversion.

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims. Adding an inverted image with the original image would seem to only brighten the original image, not enhance its contrast.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2609

5. **Claims 45, 46, 49, 51, 52** are rejected under 35 U.S.C. 102(b) as being anticipated by Flock (US-PAT-NO: 6032070).

() Regarding Claim 45:

Flock discloses a *system for capturing images of a region under skin of a part of a living body,*

(Column 3, lines 15-20, DESCRIPTION OF THE INVENTION, "system for locating an anatomical structure, such as a blood vessel, wherein the system comprises a light source and an image detector, which detects light radiation reflected from the area of examination, and a monitor which receives and displays image information from said image detector.")

enhancing blood vessel images within captured images, and

(Column 3, lines 30-35, "present invention may include elements that enhance the contrast between the anatomical structure and the surrounding tissue in the image. The term "contrast enhancing element" refers to any element or combination of elements which enhance contrast between the anatomical structure and its surrounding tissue in the image.")

displaying enhanced result images in substantially real time,

(Column 3, lines 15-20, DESCRIPTION OF THE INVENTION, "a monitor which receives and displays image information from said image detector."

Column 3, lines 53-55, "single integral unit also provides for the creation of a helmet capable of producing a real-time three-dimensional image of an area inside a patient in a manner that directly corresponds to the helmet wearer's line of vision.")

said system comprising: an infrared emitter configured to illuminate the region under the skin with waves of infrared light;

Art Unit: 2609

(Column 3, lines 15-20, DESCRIPTION OF THE INVENTION, "system for locating an anatomical structure, such as a blood vessel, wherein the system comprises a light source and an image detector, which detects light radiation reflected from the area of examination.

Column 3, lines 20-25, DESCRIPTION OF THE INVENTION: "light source includes but is not limited to polychromatic sources, such as white light sources, as well as monochromatic sources such as laser light sources."

Claim 61, "An imaging apparatus comprising a light source wherein said light source comprises a source within the infrared range;")

an infrared detector configured to accept waves of infrared light reflected from the region under the skin,

(Column 3, lines 23-27, "image detector refers to any device capable of detecting light, including but not limited to charge-coupled device infrared cameras.")

said infrared detector comprising an output for outputting a signal corresponding to unenhanced image data;

(Column 3, lines 15-20, DESCRIPTION OF THE INVENTION, "a monitor which receives and displays image information from said image detector.")

a computing unit comprising an input for accepting said unenhanced image data,

(Column 3, lines 23-27, "image detector refers to any device capable of detecting light, including but not limited to charge-coupled device infrared cameras.")

a memory,

(Column 5, line 5, "stored.")

means for enhancing and outputting result images in which enhanced images of blood vessels are shown within the images of the region under the skin of the part of the living body,

Art Unit: 2609

(Column 3, lines 30-35, "present invention may include elements that enhance the contrast between the anatomical structure and the surrounding tissue in the image. Column 5, line 5, "The two images are sequentially captured with a digitizing frame grabber, stored and subtracted from one another. The resultant image lacks the effects of scatter present in each image since scattered light is subtracted out."

and an output for outputting said enhanced images; and a

(Column 3, lines 15-20, DESCRIPTION OF THE INVENTION, "a monitor which receives and displays image information from said image detector."

Column 3, lines 53-55, "single integral unit also provides for the creation of a helmet capable of producing a real-time three-dimensional image of an area inside a patient in a manner that directly corresponds to the helmet wearer's line of vision."

Column 3, line 59, "helmet may contain a monitor, such as a monitor within an eye piece, which displays the contrasted image of the anatomical structure."

Col 4, lines 3-5, "embodiment allows the wearer to see the contrasted structure within a patient")

display device for inputting said enhanced images from output of said computing unit and displaying said enhanced images in substantially real time.

(Column 4, lines 45-55, "...light source and the reflected image detector to be part of a single integral unit... the possibility of a single integral unit also provides for the creation of a helmet capable of producing a real-time three-dimensional image of an area inside a patient.")

() Regarding Claim 46:

The system of claim 45 wherein said means for enhancing and outputting result images outputs said result images at a rate of at least five images per second.

Art Unit: 2609

(Inherent, because images are produced in real time. Column 3, lines 53-55, "single integral unit also provides for the creation of a helmet capable of producing a real-time three-dimensional image of an area inside a patient in a manner that directly corresponds to the helmet wearer's line of vision.")

() Regarding Claim 49:

Flock discloses *infrared detector is a CMOS receptor adapted to generate digital data corresponding to skin-reflected infrared wave reception.*

(Column 3, line 25-28, "image detector refers to any device capable of detecting light, including but not limited to charge-coupled device infrared cameras (CCD's).")

() Regarding Claim 51:

The system of claim 45 further comprising a headset and at least one battery in electrical communication with said computer unit, and wherein said display device, said computing unit, and said at least one battery are attached to said headset.

(Column 3, lines 53-55, "single integral unit also provides for the creation of a helmet capable of producing a real-time three-dimensional image of an area inside a patient in a manner that directly corresponds to the helmet wearer's line of vision."

Column 3, lines 56-61 "a single integral unit comprises a helmet, at least one light source and at least one imaging detector mounted on the helmet. Additionally, the helmet may contain a monitor, such as a monitor within an eye piece, which displays the contrasted image of the anatomical structure being viewed by the helmet wearer."

Battery is inherent. The headset is assumed to have portable power.)

() Regarding Claim 52:

Art Unit: 2609

The system of claim 51 wherein said infrared emitter and said infrared detector are attached to said headset.

(Column 3, lines 20-25, DESCRIPTION OF THE INVENTION: "light source includes but is not limited to polychromatic sources, such as white light sources, as well as monochromatic sources such as laser light sources."

Column 3, lines 23-27, "image detector refers to any device capable of detecting light, including but not limited to charge-coupled device infrared cameras."

Column 3, lines 56-61 "a single integral unit comprises a helmet, at least one light source and at least one imaging detector mounted on the helmet.

Claim 61, "An imaging apparatus comprising a light source wherein said light source comprises a source within the infrared range;"

Column 3, lines 63-65, "helmet receive electromagnetic radiation information reflected from the patient.")

Allowable Subject Matter

6. Claims 47, 48, 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Avinash (US-PAT-NO: 6246783) discloses "iterative filter framework for medical images." As shown in Figure 3, Avinash discloses all of the limitations of Claims 1, 20 and 36 except inverting an image. Block F₁ in Figure 3 can do transforming, smoothing

Art Unit: 2609

and retransforming. Block 12 adds a copy of an original image 10 with a processed image.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Max Shikhman whose telephone number is (571) 270-1669. The examiner can normally be reached on Monday-Friday 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Max Shikhman
2/8/2007



SHUWANG LIU
SUPERVISORY PATENT EXAMINER